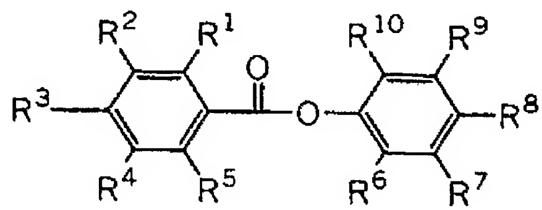
CLAIMS

1. An optical film, comprising a cellulose acylate, at least one compound represented by the following formula (I) in an amount of 0.01 to 20 mass parts to 100 mass parts of the cellulose acylate, and at least one cyclic compound having at least three substituents in an amount of 0.01 to 20 mass parts to 100 mass parts of the cellulose acylate:

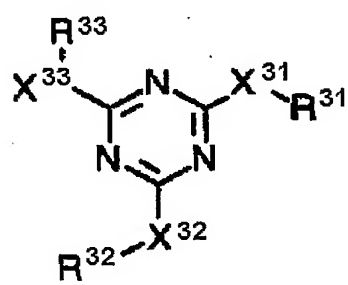
Formula (I)



wherein R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^9 and R^{10} each independently represent a hydrogen atom or a substituent, in which at least one of R^1, R^2, R^3, R^4 and R^5 represents an electron-donating group; R^8 represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 2 to 6 carbon atoms, an alkinyl group having 2 to 6 carbon atoms, an aryl group having 6 to 12 carbon atoms, an alkoxy group having 1 to 12 carbon atoms, an aryloxy group having 6 to 12 carbon atoms, an alkoxycarbonyl group having 2 to 12 carbon atoms, an acylamino group having 2 to 12 carbon atoms, an alkylcarbonyloxy group having 2 to 20 carbon atoms, a cyano group, or a halogen atom.

2. The optical film as claimed in claim 1, wherein the cyclic compound having at least three substituents is a compound represented by the following formula (II):

Formula (II)



wherein X^{31} represents a single bond, $-NR^{34}-$, -O-, or -S-; X^{32} represents a single bond, $-NR^{35}-$, -O-, or -S-; X^{33} represents a single bond, $-NR^{36}-$, -O-, or -S-; R^{31}, R^{32} and R^{33} each independently represent an alkyl group, an alkenyl group, an aryl group, or a heterocyclic group; and R^{34}, R^{35} and R^{36} each independently represent a hydrogen atom, an alkyl group, an alkenyl group, an aryl group, or a heterocyclic group.

3. The optical film as claimed in claim 1, wherein the cellulose acylate is made of a cellulose

acylate in which a hydroxyl group of the cellulose is partially substituted with an acetyl group or with an acyl group having 3 to 22 carbon atoms, and a substitution degree A of the acetyl group of the cellulose acylate and a substitution degree B of the acyl group having 3 to 22 carbon atoms of the cellulose acylate satisfy the following expression (3):

Expression (3): $2.0 \leq A + B \leq 3.0$.

4. The optical film as claimed in claim 1, wherein the cellulose acylate is made of a cellulose acylate in which a hydroxyl group of the cellulose is partially substituted with an acetyl group or with an acyl group having 3 to 22 carbon atoms, and a substitution degree A of the acetyl group of the cellulose acylate and a substitution degree B of the acyl group having 3 to 22 carbon atoms of the cellulose acylate satisfy the following expressions (3) and (4):

Expression (3): $2.0 \leq A + B \leq 3.0$

Expression (4): $0 < B$.

5. The optical film as claimed in claim 4, wherein the acyl group having 3 to 22 carbon atoms is a butanoyl group or a propionyl group.

6. The optical film as claimed in claim 1, wherein the cellulose acylate is one obtained by substituting a hydroxyl group of a glucose unit constituting the cellulose with an acyl group having 2 or more carbon atoms, and wherein when a degree of substitution of an acyl group for a hydroxyl group at the second position, a degree of substitution of an acyl group for a hydroxyl group at the third position, and a degree of substitution of an acyl group for a hydroxyl group at the sixth position in the glucose unit constituting the cellulose are designated to as DS2, DS3, and DS6, respectively, the following expressions (5) and (6) are satisfied:

Expression (5): $2.0 \leq DS2 + DS3 + DS6 \leq 3.0$

Expression (6): $DS6/(DS2 + DS3 + DS6) \geq 0.315$.

7. The optical film as claimed in claim 1, wherein a Re retardation value defined by the following expression (1) is 20 to 200 nm, and a Rth retardation value defined by the following expression (2) is 70 to 400 nm:

Expression (1): $Re = (nx - ny) \times d$

Expression (2): $Rth = \{(nx + ny)/2 - nz\} \times d$

wherein nx is a refractive index in a direction of a slow axis within a surface of the film; ny is a refractive index in a direction of a fast axis within the surface of the film; nz is a refractive index in a direction of a thickness of the film; and d is the thickness of the film.

8. The optical film as claimed in claim 1, wherein a ratio (Re/Rth) of the Re retardation value to the Rth retardation value is 0.1 to 0.8.

9. The optical film as claimed in claim 1, wherein a difference (Re700 - Re400) between the Re retardation value (Re700) at a wavelength of 700 nm and the Re retardation value (Re400) at a wavelength of 400 nm is -25 nm to 10 nm.

10. The optical film as claimed in claim 1, wherein a difference (Rth700 - Rth400) between the Rth retardation value (Rth700) at a wavelength of 700 nm and the Rth retardation value (Rth400) at a wavelength of 400 nm is -50 nm to 20 nm.

11. The optical film as claimed in claim 1, wherein a variation of the above Re and Rth in the transverse direction each are within 5%.

12. The optical film as claimed in claim 1, wherein the optical film is composed of only one cellulose acylate film having a film thickness of 20 μm to 160 μm.

13. The optical film as claimed in claim 1, wherein the cellulose acylate is a cellulose acetate having a degree of acetylation of 59.0 to 61.5%, and wherein an amount of variation in Re/Rth is 0.01 to 0.1 per 1% of the orienting ratio.

14. The optical film as claimed in claim 1, wherein a slow axis of the film forms an angle of 85° to 95° with a casting direction, and a variation in the above angle in the transverse direction is 5° or less.

15. The optical film as claimed in claim 1, wherein the film is produced by orienting a cellulose acylate film in a direction perpendicular to the longitudinal direction with carrying the film in the longitudinal direction, wherein an amount of a residual solvent of the cellulose acylate film at the start of the orienting is 2% to 50%, and wherein a slow axis of the film is in a direction perpendicular to the lengthy direction of the film.

16. An optical compensation sheet, comprising the optical film as claimed in claim 1.

17. A polarizing plate, comprising a polarizing film, and two transparent protective films disposed on both sides of the polarizing film, wherein at least one of the transparent protective films is the optical compensation sheet as claimed in claim 16.

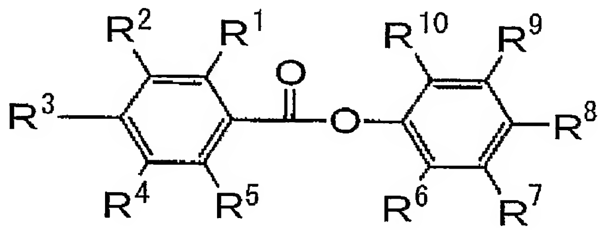
18. A liquid crystal display device, comprising a liquid crystal cell, and two polarizing plates disposed on both sides of the liquid crystal cell, wherein at least one of the polarizing plates is the polarizing plate as claimed in claim 17.

19. A liquid crystal display device, comprising a liquid crystal cell, and two polarizing plates disposed on both sides of the liquid crystal cell, said polarizing plate comprisig a polarizing film and two transparent protective films disposed on both sides of the polarizing film,
wherein the optical compensation sheet as claimed in claim 16 is disposed between the liquid crystal cell and at least one polarizing film, and a slow axis of the optical compensation sheet and a transmission axis of the polarizing film adjacent to the optical compensation sheet are arranged in substantially parallel to each other.

20. A VA-mode liquid crystal display device, comprising a liquid crystal cell, and two polarizing plates disposed on both sides of the liquid crystal cell, said polarizing plate comprisig a polarizing film and two transparent protective films disposed on both sides of the polarizing film,
wherein the optical compensation sheet as claimed in claim 16 is disposed between the liquid crystal cell and at least one polarizing film, and a slow axis of the optical compensation sheet and a transmission axis of the polarizing film adjacent to the optical compensation sheet are arranged in substantially parallel to each other.

21. An optical film, comprising a cellulose acylate, at least one compound represented by the following formula (I) in an amount of 0.01 to 20 mass parts and/or at least one compound having a 1,3,5-triazine ring in an amount of 0.01 to 20 mass parts, and at least one ultraviolet absorber in an amount of 0.1 to 20 mass parts, to 100 mass parts of the cellulose acylate:

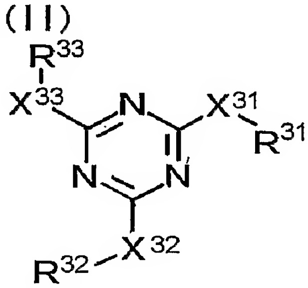
Formula (I)



wherein R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^9 and R^{10} each independently represent a hydrogen atom or a substituent, in which at least one of R^1, R^2, R^3, R^4 and R^5 represents an electron-donating group; R^8 represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 2 to 6 carbon atoms, an alkinyl group having 2 to 6 carbon atoms, an aryl group having 6 to 12 carbon atoms, an alkoxy group having 1 to 12 carbon atoms, an aryloxy group having 6 to 12 carbon atoms, an alkoxycarbonyl group having 2 to 12 carbon atoms, an acylamino group having 2 to 12 carbon atoms, an alkylcarbonyloxy group having 2 to 20 carbon atoms, a cyano group, or a halogen atom.

22. The optical film as claimed in claim 21, wherein the compound having a 1,3,5-triazine ring is a compound represented by formula (II):

Formula (I I)

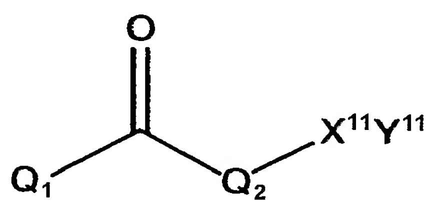


wherein X^{31} represents a single bond, $-NR^{34}-$, -O-, or -S-; X^{32} represents a single bond, $-NR^{35}-$, -O-, or -S-; X^{33} represents a single bond, $-NR^{36}-$, -O-, or -S-; R^{31}, R^{32} and R^{33} each independently represent an alkyl

group, an alkenyl group, an aryl group, or a heterocyclic group; and R^{34}, R^{35} and R^{36} each independently represent a hydrogen atom, an alkyl group, an alkenyl group, an aryl group, or a heterocyclic group.

23. The optical film as claimed in claim 21, wherein the ultraviolet absorber is a compound represented by formula (III):

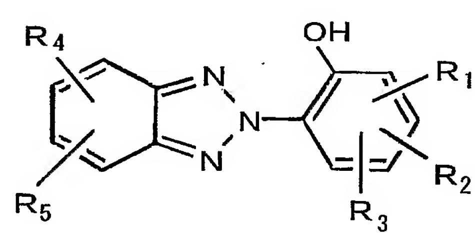
Formula (III)



wherein Q_1 and Q_2 each independently represent an aromatic ring; X^{11} represents a substituent; Y^{11} represents an oxygen atom, a sulfur atom, or a nitrogen atom; and $X^{11}Y^{11}$ may represent a hydrogen atom.

24. The optical film as claimed in claim 21, wherein the ultraviolet absorber is a compound represented by formula (IV):

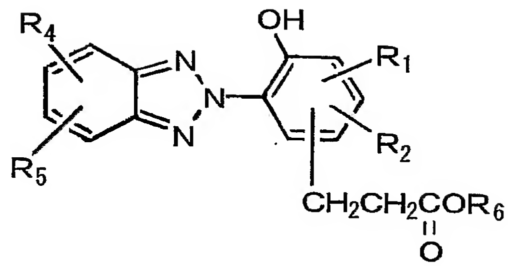
Formula (IV)



wherein R_1, R_2, R_3, R_4, and R_5 each independently represent a monovalent organic group or a halogen atom, and at least one of R_1, R_2, and R_3 is an unsubstituted, branched or straight-chain alkyl group having 10 to 20 carbon atoms in total.

25. The optical film as claimed in claim 21, which comprises an ultraviolet absorber represented by formula (V):

Formula (V)



wherein R_1, R_2, R_4, and R_5 each independently represent a monovalent organic group or a halogen atom, and R_6 represents a branched alkyl group.

26. The optical film as claimed in claim 21, wherein a Re retardation value defined by the following expression (1) is 20 to 200 nm, and a Rth retardation value defined by the following expression (2) is 70 to 400 nm:

Expression (1): $Re = (nx - ny) \times d$

Expression (2): $Rth = \{(nx + ny)/2 - nz\} \times d$

wherein nx is a refractive index in a direction of a slow axis within a surface of the film; ny is a refractive index in a direction of a fast axis within the surface of the film; nz is a refractive index in a direction of a thickness of the film; and d is the thickness of the film.

27. The optical film as claimed in claim 21, wherein a ratio (Re/Rth) of the Re retardation value to the Rth retardation value is 0.1 to 0.8.

28. The optical film as claimed in claim 21, which is composed of a cellulose acetate film having a surface energy of 55 to 75 mN/m.

29. The optical film as claimed in claim 21, which is composed of a cellulose acylate film produced by orienting at an orienting ratio of 3 to 100%.

30. The optical film as claimed in claim 21, wherein the cellulose acylate is a cellulose acetate having a degree of acetylation of 59.0 to 61.5%, and wherein an amount of variation in Re/Rth is 0.01 to 0.1 per 1% of the orienting ratio.

31. The optical film as claimed in claim 21, wherein the film is produced by orienting a cellulose acylate film in a direction perpendicular to the longitudinal direction with carrying the film in the longitudinal direction, wherein an amount of a residual solvent of the cellulose acylate film at the start of the orienting is 2% to 50%, and wherein a slow axis of the film is in a direction perpendicular to the lengthy direction of the film.

32. An optical compensation sheet, comprising the optical film as claimed in claim 21.

33. A polarizing plate, comprising a polarizing film, and two transparent protective films disposed on both sides of the polarizing film, wherein at least one of the transparent protective films is the optical compensation sheet as claimed in claim 32.

34. A liquid crystal display device, comprising a liquid crystal cell, and two polarizing plates disposed on both sides of the liquid crystal cell, wherein at least one of the polarizing plates is the polarizing plate as claimed in claim 33.

35. A liquid crystal display device, comprising a liquid crystal cell, and two polarizing plates disposed on both sides of the liquid crystal cell, said polarizing plate comprising a polarizing film and two transparent protective films disposed on both sides of the polarizing film,
wherein the optical compensation sheet as claimed in claim 32 is disposed between the liquid crystal cell and at least one polarizing film, and a slow axis of the optical compensation sheet and a transmission axis of the polarizing film adjacent to the optical compensation sheet are arranged in substantially parallel to each other.

36. A VA-mode liquid crystal display device, comprising a liquid crystal cell, and two polarizing plates disposed on both sides of the liquid crystal cell, said polarizing plate comprising a polarizing film and two transparent protective films disposed on both sides of the polarizing film,
wherein the optical compensation sheet as claimed in claim 32 is disposed between the liquid crystal cell and at least one polarizing film, and a slow axis of the optical compensation sheet and a transmission axis of the polarizing film adjacent to the optical compensation sheet are arranged in substantially parallel to each other.

37. A cellulose acetate film, comprising a cellulose acetate in which a substitution ratio at the sixth position which ratio is represented by the following expression (8) is 0.32 or more, and at least one retardation-increasing agent which has two or more aromatic rings and an octanol/water distribution factor of 1 or more and 6 or less, wherein the retardation-increasing agent is contained in an amount of 0.1% by mass to 20% by mass to the cellulose acetate:
Expression (8)
(Substitution ratio at the sixth position) = (Degree of substitution at the sixth position)/{(Degree of substitution at the second position) + (Degree of substitution at the third position) + (Degree of substitution at the sixth position)} .

38. The optical film as claimed in claim 37, wherein the Re retardation value at a wavelength of 590 nm is 20 to 200 nm, the Rth retardation value at a wavelength of 590 nm is 70 to 400 nm, and the ratio (Rth/Re) of the Rth retardation value to the Re retardation value is 1 to 10.

39. The optical film as claimed in claim 37, wherein a variation of the above Re and Rth in the transverse direction each are within 5%.

40. The optical film as claimed in claim 37, wherein a slow axis of the film forms an angle of 85° to 95° with a casting direction, and a variation in the above angle in the transverse direction is 5° or less.

41. The optical film as claimed in claim 37, wherein the film is produced by orienting a cellulose acylate film in a direction perpendicular to the longitudinal direction with carrying the film in the longitudinal direction, wherein an amount of a residual solvent of the cellulose acylate film at the start of the orienting is 2% to 50%, and wherein a slow axis of the film is in a direction perpendicular to the lengthy direction of the film.

42. An optical compensation sheet, comprising the optical film as claimed in claim 37.

43. A polarizing plate, comprising a polarizing film, and two transparent protective films disposed on both sides of the polarizing film, wherein at least one of the transparent protective films is the optical compensation sheet as claimed in claim 42.

44. A liquid crystal display device, comprising a liquid crystal cell, and two polarizing plates disposed on both sides of the liquid crystal cell, wherein at least one of the polarizing plates is the polarizing plate as claimed in claim 43.

45. A liquid crystal display device, comprising a liquid crystal cell, and two polarizing plates disposed on both sides of the liquid crystal cell, said polarizing plate comprising a polarizing film and two transparent protective films disposed on both sides of the polarizing film,
wherein the optical compensation sheet as claimed in claim 42 is disposed between the liquid crystal cell and at least one polarizing film, and a slow axis of the optical compensation sheet and a transmission axis of the polarizing film adjacent to the optical compensation sheet are arranged in substantially parallel to each other.

46. A VA-mode liquid crystal display device, comprising a liquid crystal cell, and two polarizing plates disposed on both sides of the liquid crystal cell, said polarizing plate comprising a polarizing film and two transparent protective films disposed on both sides of the polarizing film,
wherein the optical compensation sheet as claimed in claim 42 is disposed between the liquid crystal cell and at least one polarizing film, and a slow axis of the optical compensation sheet and a transmission axis of the polarizing film adjacent to the optical compensation sheet are arranged in substantially parallel to each other.